

CLAIMS

1. Equipment for cleaning the rubber cylinders (C1, C2) of continuous printing machines, characterized in that it comprises means (17, 18) for causing a very small quantity of liquid for cleaning the said cylinders to be sprayed in a controlled and uniformly distributed way on to a sufficiently long portion of cloth, which, including the area directly acted on by the said sprayed liquids, is kept in uniform and distributed contact with a transverse portion of the surface of the cylinder to be cleaned, and which is pushed into close and uniformly distributed contact with the rotating cylinder, upstream and downstream of this portion, by a rectilinear deformable strip (6) and by a rectilinear deformable presser (9) respectively, each of these having a convex surface facing the cylinder, the whole being arranged in such a way that the cleaning liquid acts through the cloth on the cylinder to be cleaned in an extended, uniform and progressive way, and in very small quantities, and in such a way that the liquid is conveniently retained in the cleaning area by means of the said cloth and the said rectilinear pushing elements, so that it does not fall off and so that it is transferred to the dirt on the cylinder in a gradual and controlled way, while the presser (9) facilitates the penetration of the liquid into the dirt and promotes the elimination and removal of the said dirt by its contact surface which is characterized by a low-relief configuration, to provide better distribution of the cleaning liquid, to provide a better mechanical action for cleaning the cylinder and to enable a large quantity of the paper particles, which constitute the dirt removed from the cylinder, to be retained in its channels.
2. Equipment according to Claim 1, in which the deformable presser (9) comprises an elastomeric membrane with a profile substantially in the form of an isosceles trapezium or reducible to this, whose longer base is fixed perimetrically and with a seal to the edge having a conjugate profile of the chamber (H) of a cross-piece (10) fixed on the said equipment, the shorter base of the said membrane being characterized by a profile which is originally slightly convex in the direction of the

cylinder to be cleaned and being characterized by the said low-relief shape.

3. Equipment according to Claim 1, characterized in that the low-relief shape of the active surface of the presser (9) comprises solid areas (109) designed to come into contact with the cloth and comprises recessed areas (209) arranged in a sinuous pattern, which form true channels of suitable depth, into which the cloth penetrates under the pressure of the solid dirt which accumulates on these portions of cloth not in contact with the said solid parts (109), the said channels (209) being characterized by a shape which is originally suitably outwardly diverging, so that, following the elastic deformation of the said surface of the presser in contact with the cylinder to be cleaned, the said channels remain conveniently open, to allow the cloth and the dirt to enter them and become self-compacted in them and then to emerge from the said channels easily when the whole equipment is removed from the clean cylinder at the end of the cycle.

4. Equipment according to Claim 3, in which the projecting parts (109) of the active surface of the presser (9) contact the cloth (4) by means of small round studs which are spaced at equal intervals in a plurality of rows aligned with the longitudinal axis of the presser (9), the rows being parallel to each other and staggered by half a step, in such a way that the studs of one row are positioned in the empty space lying between two consecutive studs of the adjacent rows and the width of this empty space being made to be less than the width of each stud, in such a way that the various studs of the projecting parts (109) are made to act jointly on the rubber cylinder in a uniform way, over the whole width of the area to be cleaned.

5. Equipment according to Claim 4, in which the number of longitudinal rows of projecting parts (109) of the elastic membrane (9) of the presser is, for example, ten.

6. Equipment according to Claim 4, in which the projecting parts (109) of the active surface of the presser (9) are also aligned with each other in oblique rows, for

example with an inclination (A) of approximately 30° to the transverse axis of the said presser, and each oblique row comprises ten projections (109).

7. Equipment according to Claim 3, in which each of the projecting parts (109) of the active surface of the presser (9) is formed by a point (109') of truncated conical shape, with an extraction angle (C) of approximately 20° and a base which is also of truncated conical shape (109'') and has an extraction angle (E) of approximately 90° , the bases of the various projecting parts being joined together to form hexagonal patterns similar to those of a honeycomb.
8. Equipment according to Claim 3, in which the bases (109'') of the projecting parts (109) in the outer longitudinal rows of the active surface of the presser (9) are joined to this surface by an outer shape which is semi-elliptical in plan view (109''').
9. Equipment according to claim 1, characterized in that the width (L1) of the low-relief active surface of the elastic membrane of the presser (9) is approximately 25 mm, while the total width of the said membrane is approximately 42 mm.
10. Equipment according to claim 3, in which the round studs of the points of the projecting parts (109) of the active surface of the presser (9), which contact the cleaning cloth (4), are flat, are spaced apart in each row with an interval of approximately 3 mm, have a diameter of approximately 2 mm each and have a height of approximately 0.5 mm.
11. Equipment according to Claim 5, in which the projecting parts (109) of the active surface of the presser (9) have their active surfaces at the following vertical distances above a theoretical base plane (G), from the outside towards the centre: $H1 = 1\text{ mm}$, $H2 = 1.4\text{ mm}$, $H3 = 1.7\text{ mm}$, $H4 = 1.9\text{ mm}$, $H5 = 2\text{ mm}$.
12. Equipment according to Claim 5, in which the longitudinal rows of projecting

parts (109) of the active surface of the presser (9) are at the following horizontal distances from a longitudinal mid-line plane (Q), from the innermost rows towards the outside:

M5 = 1.3 mm, M4 = 3.9 mm, M3 = 6.5 mm, M2 = 9.09 mm,
5 M1 = 11.69 mm.

13. Equipment according to claim 1, characterized in that it comprises at least one robust rectilinear bar (5), parallel to each cylinder (C1, C2) and movable on command towards and away from the cylinder, the ends of the bar being fixed to shoulders (1)
10 which extend away from the cylinder and which support the ends and the means of driving and braking the shafts of reels (2, 3) which are parallel to the said bar and designed to feed and collect the fabric or cloth (4) which runs, with the correct tension, over the front surface of the said bar, which is concave and which is provided, at its suitably rounded upper and lower edges (105, 205) and parallel to
15 these, with a strip (6) and a presser (9) respectively, both of these being rectilinear and made from elastomeric material, the said concave surface of the bar having seats (16) formed at a correct distance from the portion of cloth which is not acted on by the presser (9) and which lies between the presser (9) and the pressure strip (6), these seats having nozzles (17) connected to a distribution circuit (18) and to means
20 for spraying the cleaning liquids on command in a controlled, continuous and uniformly distributed way, so that when the equipment in question is brought towards the cylinder to be cleaned the portion of cloth lying between the said strip and the presser remains in tension and comes into contact uniformly with a corresponding portion of the dirty surface of the cylinder, while both the strip and the presser are
25 deformed elastically in contact with the cylinder through the cloth, to retain the cleaning liquids and to prevent these from falling from the working area.

14. Equipment according to Claim 13, characterized in that it is designed in such a way that the length of the portion of cloth positioned in front of the active surface of
30 the presser (9) is substantially equal to the length of the portion of cloth positioned in

front of the row of nozzles (17) for spraying the cleaning liquid and lying between the said presser and the elastomeric strip (6).

15. Equipment according to Claim 13, in which the pressure and sealing strip (6) is formed by a tubular rubber section having a profile substantially in the shape of a figure of eight, partially housed in a suitable rectilinear recess (7) formed in the front concave surface of the bar (5), and partially projecting from this recess to contact the said cloth (4).

16. Equipment according to Claim 13, in which the pressure and sealing strip (6) is of the simple type, with a single cavity and having a continuous longitudinal thickening (106') in the part designed for contact with the cloth (4).

17. Equipment according to claim 2, in which the cross-piece (10) which supports the elastomeric membrane (9) of the presser which acts on the cloth (4) downstream of the area in which the cleaning liquids is sprayed is mounted in a seat (12, 112) formed in the movable bar (5) of the said equipment with correct bottom clearances (11, 111) and by means of at least one pair of pins (13) positioned symmetrically in such a way that the said presser is made to exert a uniformly distributed pressure on the cylinder to be cleaned.

18. Equipment according to claim 1, characterized in that, in order to clean the opposing cylinders (C1, C2) of a continuous printing machine which operates on a continuous paper web arranged in a substantially vertical way and running, for example, in an upward direction, the said equipment comprises at least one corresponding device (D1, D2) of the type in question, arranged as mirror images of each other, in the quadrant lying between 12 and 3 o'clock for the right-hand cylinder and in the quadrant lying between 12 and 9 o'clock for the left-hand cylinder, means being provided to keep the cleaning devices in the active position of interaction with the cylinders while the cylinders remain active and in contact with the continuous

paper web (N) which is used as the means for removing and eliminating the dirt softened by the said devices, the said devices being made to be removed from the said cylinders on completion of the cleaning of the cylinders, in such a way that the dirt collected by the portion of cloth positioned in front of the presser (9) and the residual liquid fall into a tray (20) positioned under each cleaning device and designed so that it can be cleaned in its turn.

19. Equipment according to Claim 18, in which means are provided to cause the cleaning devices (D1, D2) to be carried in successive active movements of interaction with the corresponding cylinders (C1, C2) without substantially modifying the position of the cloth (4) in front of the corresponding presser (9), in such a way that the said cloth is used thoroughly, in a way compatible with its resistance to wear, means being provided to cause the cloth (4) of each cleaning device to be made to advance longitudinally only after a plurality of operating cycles, to remove the part of the cloth positioned in front of the presser (9) and to replace it with the portion of cloth which was previously positioned in front of the nozzles (17) for spraying the cleaning liquids.

20. Equipment according to Claim 19, in which means are provided to cause the portion of cloth lying between the feed reel (2) and the collection reel (3) to be brought to the correct longitudinal tension when the cleaning devices are moved away from the corresponding cylinders, to facilitate the detachment of the dirt from the cloth.

21. Equipment according to Claim 18, in which the means which keep the cleaning devices (D1, D2) in the active position of interaction with the cylinders to be cleaned are such that a continuous and/or variable modulated pressure is provided to the said devices.

22. Equipment according to claim 1, characterized in that it can also be used for

cleaning the cylinders of continuous printing machines which operate on a paper web arranged in a substantially horizontal way, the cleaning device (D1) which acts on the upper cylinder (C1) being positioned in this case in the quadrant of this cylinder lying between 1 and 3 o'clock, while the lower cleaning device (D2) is, for example,
5 positioned in the quadrant of the lower cylinder (C2) lying between 3 and 5 o'clock.

23. Equipment according to claim 1, characterized in that, for cleaning cylinders which are particularly dirty or between which the paper web (N) is not to be passed to remove the dirt, means can be provided to cause the said cylinders to be cleaned
10 with a number of movements of the corresponding cleaning devices (D1, D2) towards and away from the cylinders.